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COMPLETION OF THE FORTH BRIDGE.

BY ONE OF THE ASSISTANT ENGINEERS.

THE briefest glance at the map of Scotland abundantly evidences the *raison d'être* of the gigantic structure across the Firth of Forth, whose successful completion has just marked so important an era in the annals of engineering.

Various projects had from time to time been mooted for the bridging of the Firth, but were one by one abandoned. In 1881, however, the North British, Great Northern, North-Eastern, and Midland Railway Companies, being anxious to attain direct communication to the north of Scotland, which should enable them to compete with the west coast companies for this traffic on equal if not more favourable terms, instructed their respective consulting engineers, Sir John Fowler, K.C.M.G., the late Mr Harrison, and Mr Barlow, to report on the matter. On the 4th May 1881 these engineers submitted a joint Report, the result of prolonged consultations, unanimously agreeing that the steel cantilever Bridge designed by Sir John Fowler and Mr B. Baker fulfilled all the necessary conditions, and was the least expensive and most suitable design for bridging the Firth of Forth. The Forth Bridge Railway Company accordingly appointed Sir John Fowler and Mr B. Baker as engineers for the undertaking; and by the close of 1882 the contract was let to the combined firm of Messrs Tancred, Arrol, & Co., who forthwith commenced active operations.

Before passing to the building of the structure and the many points of interest therewith connected, we propose briefly to deal with the principle of the cantilever and the general features of the Bridge itself.

The word 'cantilever,' which denotes a bracket, is becoming rapidly popularised. In the Forth Bridge, as will be seen from the annexed diagrams, the brackets are double, being placed back to back and fastened together. No better illustration of the cantilever principle can be given than that of Mr Baker's 'human cantilever'—namely, two men

sitting on chairs, with extended arms, and supporting the same by grasping sticks butting against the chairs. In the Forth Bridge the chairs must be imagined to be placed a third of a mile apart, and the men's heads to be three hundred and sixty feet above the ground. Their arms are represented by huge steel lattice members, and the sticks or props by steel tubes twelve feet in diameter and one inch and a quarter thick.

No novelty is claimed for the cantilever system. It is, as a matter of fact, a prehistoric arrangement, as illustrated in the stone corbel and lintel combinations found in the earliest Egyptian and Indian temples.

Passing on to the leading dimensions of the Forth Bridge, the total length of the structure is 8296 feet, or nearly 1½ miles; and there are two spans of 1710 feet, two of 680 feet, fifteen approach viaduct spans of 168 feet, four granite arches of 57 feet span on the south shore; with three arches of similar construction and 25 feet span at the corresponding northern abutment. A clear headway of 150 feet at high-water spring-tides is allowed. The extreme height of the structure is 361 feet above high-water, the greatest depth of the foundations being about 90 feet below the same level.

The main masonry piers, three in number, situated respectively on the south shore, on the island of Inchgarvie (an island fortuitously placed midway between the two deep channels), and on the Fife shore, consist each of a group of four masonry columns of concrete or rubble faced with granite, and 49 feet in diameter at the top by 36 feet high; resting either on solid rock, as in the case of the Fife and two northern Inchgarvie piers; or on caissons filled with concrete, as in the case of the two southern Inchgarvie and the Queensferry piers.

The masonry abutments at each end of the Bridge call for no special remark, and may be here dealt with. Their dimensions have been already given. The foundations were in the dry, and presented no features of difficulty. The piers and arches were built of granite brought

from the well-known quarries at Aberdeen direct to the site by sea.

Upwards of 21,000 tons of cement, 707,000 cubic feet of granite, and 117,000 cubic feet of masonry and concrete were employed in the foundations and piers; whilst no less than one million cubic feet of timber were used for temporary purposes.

Whilst the foundations and masonry had been proceeding, steady progress had been maintained in the workshops in preparing the materials for the cantilevers. Visitors to South Queensferry

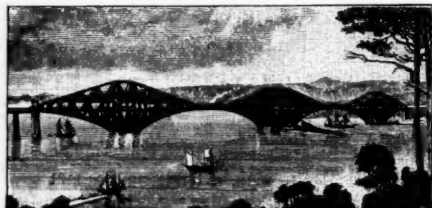


Fig. 1.—General View of the Forth Bridge.

will recall to mind the admirable equipment of the workshops and girder-yards and the interesting methods of dealing with the steel plates and bars. It is beyond the limits of the space at our disposal to deal with the plant employed in manipulation of the girder-work in any detail; suffice it merely to point out that from the eight hundred

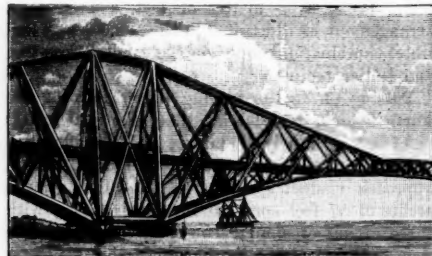


Fig. 2.—One of the Cantilevers.

ton hydraulic bending-press, employed for bending the plates forming the tubes, down to the smallest tool, the latest and most approved machinery was adopted, a large quantity of it being specially designed for the work. The drill-roads with their admirable plant will be recollected, where the various members were fitted together, drilled, and then taken down, to be subsequently re-erected *in situ*.

It is unnecessary to do more than mention the numerous offices, stores, dwelling-houses, &c., located for the work. The requirements and organisation of a vast staff of men numbering at one time over four thousand for the carrying out of such an undertaking will be readily apparent to our readers.

The erection of the so-called vertical tubes over the main piers formed the first stage after the completion of the bed-plates and skew-backs. These columns are twelve feet in diameter and three hundred and forty-three feet high. They were built to a height of about thirty feet by means of ordinary cranes supported on timber staging. The remainder of their erection was

performed from a platform, which, elevated by means of hydraulic lifting presses working inside the columns, was carried up with them. The platform, which was raised about sixteen feet at a lift, carried with it all necessary cranes, rivet furnaces, &c., in addition to shelters for the men. Access to the platform was gained by means of cages, similar to those employed in mines, and actuated in a like manner by winding-engines; all material, &c., being similarly wound up to the platform ready for erection.

The riveting of the work was performed by specially designed machines, worked by hydraulic power; the rivets, of which there are no fewer than eight millions in the entire structure, being heated in furnaces burning refuse oil, a novelty which has proved so successful that its use is now largely adopted.

The erection of the vertical columns being completed in some six months, the top member connecting them (see fig. 2) was duly built into position on the platform, now resting on the summit of the columns. Meanwhile, the bottom members, formed of tubes varying in diameter from twelve feet to five feet, were carried out on either side by means of a crane secured to a movable groundwork, which travelling along the tube itself followed up the erection. The top members and the upper portions of the struts and ties were erected by means of special cranes travelling along the top members themselves.

The material, already fitted, drilled, and in some cases also partially riveted up in the workshops on shore, was brought in steam barges to the ends of the cantilevers, and by means of the cranes already enumerated, speedily transferred to their final position in the structure.

Various methods were proposed for the erection of the 350 feet central span joining the arms of the cantilevers; that finally adopted being to build it out from each end, cantilever fashion, with the requisite temporary supports, until a junction in the middle was effected. The southern central girder was closed on October 10, 1889; that over the northern channel on the 7th November following.

The 54,000 tons of steel employed in the Forth Bridge is that known as mild steel, and was made on the open hearth or Siemens-Martin process. Two qualities were employed, one to resist tensile and the other compressive strains; having strengths respectively of thirty to thirty-three, and thirty-four to thirty-seven tons per square inch in tension. Under the combined circumstances of the most adverse conditions for the stability of the structure, the maximum rolling load, and the fiercest hurricane, the strain will never exceed seven and a half tons per square inch, and in some parts considerably less: it will readily be perceived how ample is the margin of safety allowed.

The changes resulting from variations of temperature have of necessity to be allowed for, and in so large a structure they are considerable—an inch for every hundred feet being arranged for in expansion and contraction, the space over the whole length of the structure gives for this purpose no less than seven feet. For each pier and cantilever, with part of the connecting girder which it has to carry, eighteen inches of play have been designed.

The surface of the Bridge requiring to be kept painted is no less than twenty acres; whilst the rivets employed if laid end to end would cover about 380 miles in length; and the plates used in the construction would extend a distance of over forty-four miles.

The structure was tested by the engineers on the 21st January of this year by placing on the centre of the two 1700 feet main spans, two trains, each made up of fifty loaded coal-wagons, and three of the heaviest engines and tenders; the total load thus massed upon the span being the enormous weight of 1800 tons, or more than double that which the Bridge will ever in practice be called upon to sustain. The results attained were most satisfactory in every respect, and in exact accordance with the calculations of the engineers. Three days later, the first passenger train was driven across the structure by the Marchioness of Tweeddale. The formal opening ceremony is fixed for the 4th of March, and will be performed by His Royal Highness the Prince of Wales.

The approach lines in connection with the Forth Bridge are rapidly nearing completion, and consist of lines between Winchburgh and Dalmeny—giving direct access to the Bridge from Glasgow—and between the Bridge and Edinburgh. On the north side, Inverkeithing is being directly connected with the Bridge, and Burntisland with Inverkeithing. Various shorter lines and widenings are being carried out, and the Glenfarg Railway is being pushed forward to completion.

In conclusion, we may add that the Forth Bridge and the approach lines will, it is confidently anticipated, reduce the journey from Edinburgh to Perth or Dundee from two and a half hours to little more than one hour. In the same manner the run from Edinburgh to Aberdeen should be made in three and a half hours instead of four and a half or five; and that to Inverness in six and a half instead of eight hours; whilst on the journey from London to the north of Scotland a saving of an hour or an hour and a half may be anticipated.

MY SHIPMATE LOUISE.

THE ROMANCE OF A WRECK.

CHAPTER VIII.—A STRANGE CARGO.

WE took the north-east trades on the Canary parallels; but they blew a very light breeze, occasionally failing us, indeed, with more than once a positive hint of a shift in the western sky, though no change happened. Captain Keeling declared that in all his time he never remembered the like of so faint a trade-wind. Yet we managed to kill the time with some degree of entertainment to ourselves.

Colledge and I were good friends, and had long yarns together in our cabin and on deck. The characteristic I liked him best for was a certain naiveté. He would speak of his engagement with Fanny Crawley as a schoolboy might of a like experience, and not seem to know what to make of it. One day he was lying in his bunk smoking a pipe, and he had lugged her portrait from his breast-pocket to have a look at it.

'Upon my word, Dugdale,' said he languidly, 'hang me now, if it was not for Fanny here, I'd propose to Louise Temple. She's a ripping girl, and the sort of woman my father would like; a fine stately presence for a drawing-room, eh? Figure the dignity with which she would kiss the hand of a sovereign, making the business quite the other way about by her salutation, and queening it to the confusion of every eye. My father doesn't very much care about Fanny—has no style, he thinks—nothing distinguished about her.'

'But you are engaged to her with his sanction, I presume?'

'I don't know,' he answered.

I laughed, and said: 'Has Miss Temple heard that you're engaged to be married?'

'No,' he answered with a small air of confusion; 'there was no need to tell her. What should there be in such a confession to interest her? You're the only person on board the ship that I have mentioned the thing to. Of course I can trust to you,' said he soothingly.

'Trust me!' I exclaimed, laughing again. 'There is nothing wrong surely in this engagement that you should fear the betrayal of the secret of it? But since it is a secret, it is perfectly safe in my keeping.'

'Do you think I ought to tell Miss Temple that I'm engaged?' said he.

'Well, if you are making love to her,' said I, 'it might be as well to give her a hint that you're not in earnest.'

'Oh, but, confound it, I *am*!' he cried. 'I mean,' he added, catching himself up, 'I think her a doocidly charming girl, and the most delightful creature to flirt with that ever I met in my life; but if I go and tell her I'm engaged—'

'Well?'

'It would knock my association with her on the head. It is not as if Fanny were within reach of an early post. Even if I were disposed to break off my engagement with her, it must take me some months to do it.—D'y'e understand me?'

'You mean, of course,' said I, 'that no letter can reach her under seven or eight months, unless, indeed, you conveyed one to her by a homeward-bound ship.'

'Ay; but putting the homeward-bound ship aside, Fanny could not know of my resolution—were it ever to come to that—until she received the letter I posted to her in India; therefore, I should have to consider myself engaged to her all that time.'

'No doubt,' said I, beginning to feel bored.

'Miss Temple would take that view,' said he, 'and that's why I don't choose to tell her the truth.'

'I don't quite follow your logic,' I exclaimed; 'but no matter. It may be that you want too much in the way of sweethearts. But so far as your secret goes, you can trust me to hold my tongue. Possibly, I may admire Miss Temple as warmly as you do; see qualities in her superior even to her excellence as a mistress of postures; but I do not yet love her so passionately as not to wish to see her chastened a bit by the lesson she is likely to learn from your delight in her society.'

'I don't understand,' he exclaimed, lazily knocking the ashes of his pipe out through the open porthole.

'Neither do I,' cried I, springing to my legs with a loud yawn. 'Heaven bless us, my dear Colledge! here are we now, I daresay, a fair thousand miles from the nearest African headland. Surely we are distant enough from all civilisation, then, to be clear of the influences of the girls! Take my advice, and keep your heart whole till you get to India. There may be a Princess waiting for you there, more likely to value a tiger-hide offering than Miss Temple; whilst Miss Crawley's broken heart will mend apace when she learns that your wife has a black skin.'

'Oh, hang it all'— I heard him begin; but I was sick of the subject, and sauntered forth to see what was doing on deck.

When I arrived on the poop, I found the captain standing aft surrounded by a number of ladies, directing a binocular glass at the sea over the starboard bow. The chief-mate at the head of the poop ladder was likewise staring into the same quarter, with Mr Johnson alongside, bothering him with questions, and little Saunders on tiptoe, to see over the rail, fanning his face with a large flapping black wide-awake.

I stepped to the side to look, and saw some object about a mile distant, that emitted a wet flash of light from time to time. I asked the mate to lend me his glass, and at once made the thing out to be a capsized hull of a vessel of about eighty tons. She floated almost to the line of her yellow sheathing, and the gold-like metal rising wet to the sun from the soft sweep of the blue brine darted flashes as dazzling as flame from the mouth of a cannon.

I returned the glass to Mr Prance.

'She has not been long in that condition, I think?' said I.

'Not twenty-four hours, I should say,' he answered. 'I see no wreckage floating about her.'

'Nor I. If she had a crew on board when she turned turtle,' I said, 'she may have clapped down upon them as you imprison flies under a tumbler.'

'God bless us, what a dreadful death to die!' cried little Saunders. 'I can conceive of no agony to equal that of being in a cabin in a sinking ship and going down with her, and *knowing* that she is under water and still settling.'

The little chap shuddered and pulled out a great blue pocket-handkerchief, with which he dried his forehead.

'How long could a man live in a cabin under water?' asked Mr Johnson.

'Long enough to come off with his life,' answered the mate, bringing the glass from his eye and looking at Mr Johnson.—'I'll give you a queer yarn in a few words, sir; wild enough to furnish out an A1 copper-bottomed sea-tale to some one of you literary gentlemen. A small vessel was dismasted 'twixt Tariffa and Tangier in the middle of the Gut there. All her crew saving one man got away in the boat. The fellow that was left lay drunk in the cabin. A sea shifted her cargo; shortly after she capsized and went down. A few days later, that same

ship floated up from the bottom of the sea on to the shore near Tangier. She was boarded, and they found the man alive in the cabin.'

'What was the vessel's cargo, Mr Prance?' inquired little Saunders.

'Oil and brandy, sir.'

'Don't you think,' exclaimed Mr Johnson, 'that your story is one that would be very acceptable to the marines, Mr Prance, but that would not be believed by your sailors were you to tell it to them?'

Here the captain, who had been slowly coming forward, accompanied by half-a-dozen ladies, interrupted us.

'Mr Prance.'

'Sir?'

'That object yonder is a danger in the way of navigation. I think it would be kind in us to send a shot at it.'

'Ay, ay, sir.'

'We will shift the helm,' continued old Keeling, in the sketched, buttoned-up sort of voice and air he was wont to use when addressing his mates in the presence of the passengers, 'so as to bring the wreck within reach of our carronades.'

'Very good, sir.'

'I expect,' continued old marline-spike, 'that she is floating on the air in her hold rather than on her cargo, even though it be cork; and if we can knock a hole in her, she will sink.'

Mr Prance went aft to the wheel, and the vessel's course was changed. Instructions went forward; and the boatswain, who combined with his duties the functions of chief-gunner aboard the *Countess Ida*, superintended the loading of a couple of pieces.

'Please tell me when they are going to fire, Mr Riley, that I may stop my ears,' cried Miss Hudson, who looked a very lovely little woman that morning in a wide straw hat and a body of some muslin-like material, through which the snow of her throat and neck showed, making you think of a white rose in a crystal vase.

Mr Greenhew, with a glance full of scissors and thumbscrews, as sailors say, at Mr Riley, told Miss Hudson that if she objected to the noise, he would insist that the gun should not be fired, and would make it a personal matter between himself and the captain if the carronades were discharged.

'Not for worlds, thank you very much all the same,' said Miss Hudson, sending a languishing look at him through her eyelashes; which, being witnessed by Mr Riley, would, I did not doubt, occasion a large expenditure of sarcasm between the young men later on.

The motion of the ship was very slow, and we had floated almost imperceptibly down upon the wreck. The skipper then suggested that the ladies should go aft, and off they went in a flutter and huddle of many-coloured gowns, Mrs Colonel Bannister leading the way, and Mrs Hudson limping in the wake with her fingers in her ears. A chap with a purple face and immense whiskers was sighting the piece.

'Let fly now, whenever you are ready,' shouted Mr Prance.

There was a roaring explosion; Mr Johnson recoiled on to the feet of Mr Emmett, who

shouted with pain, and went hopping to the skylight with a foot in his hand. There were several screeches from the ladies, and methought the whiskers of the Colonel, who stood beside me thirstily looking on, forked out with an added tension of every separate fibre, to the thunder of the gun and the smell of the powder. The ball flew wide.

'Another shot!' called out Mr Prance.

Bang! went the piece. I had my eye on the wreck at that moment, and saw half the stern-post, from which the rudder was gone, and a few feet of the keel to which it was affixed, vanish like a shattered bottle.

'That's done it!' cried old Keeling with excitement as he stood ogling the wreck through his binocular. 'If a hole that'll let the air out is to sink her, she's as good as foundered.'

He had scarcely said this when there was a sudden roar of voices along the whole length of our ship.

'See! she is full of men!'

'Heart alive, where are they coming from?'

'They're rising as if they were dead bodies, and the last blast was sounding.'

'What'll they be? What'll they be?'

'Defend us! they must all be afloat in a minute and drowning!'

Fifty exclamations of this kind rolled along the bulwarks, where the sailors had gathered in their full company to watch the effect of the shot. There was no glass within reach of me; but my sight was keen, and at the first blush I believed that the hull had been a slaver, that she had capsized when full of negroes, and that our round-shot had made a man-hole aft big enough for them to escape through. There were twenty or thirty of them. They came thrusting through the aperture with extraordinary agility, and most of them held a very firm seat on the clean line of the keel. But every now and again one or another of them would lose his balance and slide down the hard bright surface of the yellow sheathing upon the round of the bilge plump into the water, where you would observe him making frantic but idle efforts to reclinb the wet and slippery slope.

'Monkeys, as I am a man!' roared Mr Prance.

'A cargo of monkeys, sir!' shouted the skipper from the other end of the poop, whilst he kept his glasses levelled at the wreck.

A sort of groaning note of astonishment, followed by a wild shout of laughter, came along from the Jacks. Indeed, one needed to look hard at the thing to believe in it, so incredibly odd was the incident. One moment the wreck was a mere curve of naked yellow sheathing flashing to the sun as it rolled; the next, pouff! went the thunder of one gun, and as though its grinning adamantine lips owned some magical and diabolical potency of invocation, lo! the hole made by the shot was vomiting monkeys, and in a trice the radiant rounds of the keel-up fabric were covered with the figures of squatting, clinging, grinning creatures of all sizes, some like little hairy babies, some like men as large at least as Mr Saunders.

'There'll be a human being rising out of that hole before long, I expect,' said Mr Prance. 'He must needs be slower than the monkeys if he's a man.—How many d'ye make, Mr Dugdale?'

'Some thirty or forty,' said I. 'But I tell you what, Mr Prance: there'll be none left in a few minutes, for the hull is sinking rapidly.'

At that instant Captain Keeling sung out: 'Mr Prance—have one of the quarter-boats manned. It is as I thought—the hull was floating on the air in her hold, and she's settling rapidly. We can't let those poor creatures drown. Get the main topsail backed.'

A boat's crew came bundling aft to the cry of the mate; in a mighty hurry the gripes were cast adrift, and the tackles slackened away with the men in their places, and the fourth officer in the stern sheets shipping the rudder as the boat sank. There was a deal of confusion for the moment, what with the tumbling aft of the sailors, the passengers getting out of their road, the hubbub of ladies' voices, and the cries of the seamen dragging upon the weather main-braces to back the yards.

'There she goes!' cried I; 'there'll not be many of the creatures rescued, I believe. Monkeys are indifferent swimmers.'

'Lively now, Mr Jenkinson,' yelled Mr Prance to the fourth officer, 'or they'll all be drowned.'

The chaps gave way with a will, and the boat buzzed towards the patch of little black heads that rose and sank upon the swell as though a sack of cocoa-nuts had been capsized out there. All hands stood gazing in silence. The drowning struggle of a single beast is a pitiful sight; but to see a crowd perishing, a whole mob of brutes horribly counterfeiting the aspect and motions of suffering humanity with their faces and gestures, is painful, and indeed intolerable. The ladies had come to the forward end of the poop out of the way of the seamen pulling upon the main brace, and I found myself next to Miss Temple at the rail.

'They *are* monkeys, I suppose?' she said, swiftly shooting a glance of her black eyes at me, and then staring again seawards with her pale face as passionless as a piece of carving, and nothing to show that she was in the least degree moved by the excitement of the scene of drowning monkeys and speeding boat, saving her parted lips, as though she breathed a little fast.

'They are as much monkeys,' said I, 'as fur and tails can make a creature.'

'Do you suppose there were living people locked up in that hold?'

'God forbid!' said I. 'It is not a thing to conjecture *now*.'

'How could those monkeys have lived without air?'

'Air there must have been, Miss Temple, or they could not have lived. The story of the wreck seems simple enough to my mind. She was, no doubt, a little schooner from the Brazilian coast, bound to a European port with a freight of monkeys, which are always a saleable commodity. They would be stowed away somewhere aft in the run, perhaps, as it is called. The vessel capsized, and floated, as Captain Keeling suggested, upon the air in her. Our cannon-ball knocked a hole in the hulk right over the monkeys' quarters, and out they came. I can tell you of more wonderful things than that.'

'She must have *capsized*, as you call it, very recently,' said she, glancing at me again—it was

rarely more than a glance with her, as though she believed that such beauty as her eyes had entitled them to a royal privacy.

'No doubt,' I answered.

By this time the boat had reached the spot where the hulk had foundered, and we could see the men lying over the side picking up the monkeys. I ran my gaze eagerly over the surface there, somehow fancying that one or more bodies of men might rise; but there was nothing in that way to be seen. The boat lingered with the fellows in her standing up and looking around them. They then reseat themselves, the oars sparkled, and presently the little fabric came rushing through the water to alongside.

'How many have you picked up, Mr Jenkinson?' cried the mate.

'Only eight, sir. I believe they were half-dead with hunger and thirst, and had no strength to swim, for most of them had sunk before we could approach them.'

'Hand the poor brutes up.'

Some of the Jacks jumped into the chains to receive the creatures, and they were passed over the rail on to the quarter-deck. Deeply as one might pity the unhappy brutes, it was impossible to look at them with a grave face. One of them was an ape with white whiskers like a frill, and a tuft of hair upon his brow that made the rest of his head look bald. He had lost an eye, but the other blinker was so full of human expression that I found myself shaking with laughter as I watched him. He sat on his hams like a Lascar, gazing up at us with his one eye with a wrinkled and grinning countenance of appeal grotesque beyond the wildest fancies of the caricaturist. There was one pretty little chap with red fur upon his breast like a waistcoat. Some of the creatures, on feeling the warm planks of the deck, lay down in the exact posture of human beings, reposing their heads upon their extended arms and closing their eyes.

'Bo'sun,' called Mr Prance, 'get those poor beasts forward and have water and food given them. Swing the topsail yard—lee main topsail braces.'

In a few minutes the quarter-deck was clear again, with an ordinary seaman swabbing the wet spaces left by the monkeys, and the ship quietly pushing forwards on her course.

(To be continued.)

THE STORY OF PENNY POSTAGE.

THE Jubilee of Penny Postage and its inception by Sir Rowland Hill, is an event well calculated to arouse the deepest interest throughout the civilised world, for that great social reform, introduced fifty years ago, has unquestionably spread its beneficial influence over every country in which a postal system of any kind exists.

The Hill family were, we know, in those bygone days far from being well off, and were often hard put to to find the money to pay the high postage on letters which they received. Born in 1795, Rowland Hill was considerably past middle life before he entertained any idea of practising his reforming hand on the Post-

office, and had passed a busy existence chiefly as a schoolmaster, in which capacity he had indulged in many schemes, scholastic and otherwise, with more or less success. At the time that his attention was first directed to Post-office matters, he was employed as Secretary of the Commissioners for the Colonisation of South Australia. He was no doubt attracted to the subject of postal reform by the frequent discussions which were then taking place in parliament in regard to the matter. Mr Wallace of Kelly, the member for Greenock, who was the champion of the cause in the House of Commons, was fierce in his denunciation of the existing abuses and irregularities of the post, and subsequently proved a strong and able advocate of the scheme for postage reform.

Once arrested by the subject which has since made his life famous, Rowland Hill went to work in a very systematic manner. Firstly, he read very carefully all the Reports relative to the Post-office; then he placed himself in communication with Mr Wallace and the Postmaster-general, both of whom readily supplied him with all necessary information. In this manner he made himself acquainted with his subject, with the result that, in 1837, he published his famous pamphlet on *Post-office Reform: its Importance and Practicability*, the first edition being circulated privately amongst the members of parliament and official people; whilst some months later a second edition was published which was given to the public.

We have to remember that at this time the postage charges were enormously high, that they depended not upon weight alone, but also upon the number of enclosures, and that they varied according to distance. Thus, for example, a letter under one ounce in weight and with one enclosure (that is, sheet or scrap of paper) posted in London for delivery within the metropolitan area, or even, we believe, fifteen miles out, cost 2d.; if for delivery thirty miles out, 3d.; eighty miles out, 4d.; and so on. Again, as showing how the charges according to enclosure operated, a letter with a single enclosure from London to Edinburgh was charged 1s. 1½d.; if double, 2s. 3d.; and if treble, 3s. 4½d. Moreover, the charges were not consistently made, for whereas an Edinburgh letter (posted in London) was charged 1s. 1½d., a letter for Louth, which cost the Post-office fifty times as much as the former letter, was only charged 10d.

The public, however, found means of their own of remedying the evil, which, if not wholly legitimate, were under the circumstances to be regarded with some degree of leniency. Letter-smuggling was a not unnatural result of the high and disproportionate charges referred to, and was almost openly adopted to an extent that is hardly credible. Thus, many Manchester merchants—Mr Cobden amongst the number—stated before the Post-office Inquiry Committee appointed in 1838, their belief that four-fifths of the letters written in that town did not pass through the Post-office. A carrier in Scotland confessed to

having carried sixty letters daily for a number of years, and knew of others who carried five hundred daily. A Glasgow publisher and bookseller said he sent and received fifty letters or circulars daily, and added that he was not caught until he had sent twenty thousand letters otherwise than through the post! There were also other methods of evading the postage rates at work. Letters were smuggled in newspapers, which in these days passed free within a stated period through the post, the postage being covered by the stamp duty impressed on the papers. Invisible ink, too, was used for inditing messages on the newspapers themselves; while the use of certain pre-arranged codes on the covers of letters was likewise systematically adopted, the addressees, after turning the letters over and learning from the covers all they desired to know, declining to take in the letters on the ground that they could not afford to pay the postage.

The system of 'franking' letters in the high-postage days led to an appalling abuse of that privilege, which belonged to peers and members of the House of Commons. It was no doubt originally allowed to enable members to correspond with their constituents; but under the circumstances it is perhaps not surprising that the plan soon became abused, and was ultimately used to cover all kinds of correspondence, not only members' but other people's as well. At one time, indeed, all sorts of curious packages passed free under the franking privilege, such as dogs, a cow, parcels of lace, bales of stockings, boxes of medicine, fitches of bacon, &c. Sometimes, indeed, franked covers were actually sold; and they have even been known to be given in lieu of wages to servants, who speedily converted them into ready-money.

This abuse, taken together with the illicit traffic in letters, so openly and widely carried on, formed of course a most important argument in favour of the proposals for cheap postage formulated by Rowland Hill, and no doubt did much to damage the cause of his opponents. But there is one other abuse to which Londoners were subject which may just be mentioned. At that time the Twopenny Post was in operation in the English metropolis, and would have fairly served the inhabitants in postal matters if it had not been for the practice which existed of allowing commercial houses and other firms who were willing to pay for the privilege to have their letters picked out from the general heap and delivered by special postmen, and so enable them to get their correspondence an hour earlier than those who did not pay the 'quarterage,' as it was termed, of five shillings (per quarter), and which, it appears, went into the pockets of the postmen concerned, many of whom, we are told, and it can easily be understood, thus made incomes of from three to four hundred pounds a year. However beneficial such a system was to commerce and trade in London, it operated most unfairly on ordinary correspondents, and it was certainly not the least of the evils which the introduction of Penny Postage swept away.

It is not necessary to enter at any length into all the arguments that weighed with Rowland Hill in propounding his great scheme. It need

only be very briefly stated that the great point to which he applied himself was the cost to the Post-office of receiving, transmitting, and delivering a letter. Having roughly and, as subsequently proved, not inaccurately calculated the average postage at sixpence farthing per letter, he then went to work to ascertain the expenses of management; and the result of his investigations showed that, no matter what distance had to be traversed, the average cost of each letter to the government was less than one-tenth of a penny! From this there was only one conclusion that could well be forced on his mind, and that was a uniform rate of postage. Having solved this great problem, there were many other matters of adjustment and improvement to which his attention had to be given. He was, for example, not long in deciding that the charge according to enclosures was an iniquitous one, and that a just and fair tax could only be made according to weight. Then, again, he clearly saw that the principle of throwing the postage on the recipients of letters was an improper one, while it was also a burden on the Post-office employees. The prepayment of postage became necessarily a feature of his plan; but he experienced some difficulty in arriving at a feasible method of adopting it. At first he considered that this might be carried out by payment of money over the counter; but he subsequently came to the conclusion that the purposes of the public and the Post-office would be better served by the use of some kind of stamp or stamped covers for letters, and this arrangement he brought forward and fully explained before the Commissioners of Post-office Inquiry, referring to it as 'Mr Knight's excellent suggestion.' The following extract from the Commissioners' Report, which gives a brief description of the proposed arrangement, may perhaps be read with interest at the present time:

'That stamped covers, or sheets of paper, or small vignette stamps—the latter, if used, to be gummed on the face of the letter—be supplied to the public from the Stamp-office, and sold at such a price as to include the postage. Letters so stamped to be treated in all respects as franks. That each should have the weight it is entitled to carry legibly printed upon the stamp. That the stamp of the receiving-house should be struck upon the superscription or duty stamp, to prevent the latter being used a second time. The vignette stamps being portable, persons could carry them in their pocket-books.'

The proposed arrangement met with approval from the Commissioners, and also from the Committee on Postage in 1837 and 1838; and, in consequence, the Penny Postage Act of 1840 contained a clause providing for the use of such stamps and stamped covers.

Such were the main points of Rowland Hill's plan, which was so logical and reasonable in all its features, and so intelligible to the popular mind, that it can be readily understood how heartily it was embraced by the general public. But popular as his scheme was with the mass of the people, it encountered the bitterest opposition from many quarters; and in successfully carrying it through, Rowland Hill had, like most other great reformers, to overcome huge difficulties and obstacles. It is very amusing at this distance of time, when we have become so

accustomed to the immense advantages of penny postage as to view them almost as part of the ordinary conditions of life, to recall some of the arguments used fifty years ago against the measure. Lord Lichfield, as Postmaster-general, in advertent to the scheme in the House of Lords, described it thus, 'of all the wild visionary schemes which I have ever heard of, it is the most extravagant;' and endorsed this statement six months later when he had given more attention to the subject, being 'even still more firmly of the same opinion.' On a subsequent occasion he contended that the mails would have to carry twelve times as much in weight as before, and therefore the charge would be twelve times the amount then paid. 'The walls of the Post-office,' he exclaimed, 'would burst; the whole area in which the building stands would not be large enough to receive the clerks and letters.' Outside the Post-office, too, as well as by both the Government and Opposition, much animosity was exhibited against the proposal.

If, however, the opposition against the introduction of Penny Postage was strong, the advocacy of the plan was no less powerful, while, moreover, it was thoroughly backed by popular opinion. Complaints as to the high rates of postage flowed in, and parliament was nearly inundated with petitions in favour of the scheme, which also received much literary support. The Mercantile Committee during all the time of agitation actively spread information of the progress of the measure, with a view to rouse the public to a sense of its importance. The *Post* circular kept circulating; and handbills, fly-sheets, and pictorial illustrations were freely distributed. One print took a dramatic form, representing 'A Scene at Windsor Castle,' in which the Queen, being in the Council Chamber, is made to say: 'Mothers pawning their clothes to pay the postage of a child's letter! Every subject studying how to evade the postage without caring for the law!'—(To Lord Melbourne): 'I trust, my lord, you have commanded the attendance of the Postmaster-general and Mr Rowland Hill, as I directed, in order that I may hear the reasons of both about this universal Penny Postage plan, which appears to me likely to remove all these great evils.' After the interview takes place, the Queen is made to record the opinion that the plan 'would confer a great boon on the poorer classes of my subjects, and would be the greatest benefit to religion, morals, to general knowledge, and to trade.' This *jeu d'esprit*, which was published by the London Committee, was circulated by thousands, and proved extremely useful in bringing the burning question home in an attractive form to the masses of the nation.

The agitation as to Rowland Hill's scheme lasted for two years, and with such vehemence that the period has become an epoch in the history of this country. The end of the story of this memorable reform is soon told; for an agitation which may be said to have shaken the nation to its core and was felt from end to end of the kingdom could have but one conclusion, and that a successful one. A Parliamentary Committee was appointed to inquire into the whole matter; and after a session of sixty-three days, reported in favour of Penny Postage. That

was in August 1838. Next year a Bill for Cheap Postage passed through parliament with slight opposition; and on the 12th of November 1839 the Treasury issued a Minute authorising a uniform rate of fourpence for inland letters. This was, however, merely a temporary measure, in which Rowland Hill concurred, and was resorted to chiefly to accustom the Post-office clerks to a uniform rate and the system of charging by weight. The full measure of the Penny Postage scheme was accomplished a few months later on, when, on the 10th of January 1840, the uniform rate of One Penny for letters not exceeding half an ounce in weight was officially introduced.

Such in brief is the story of Penny Postage, which has caused such a revolution not only in the postal arrangements of this country, but in the conditions of all sections and grades of society. In the first year of its operation the number of letters posted was more than doubled, the number sent in 1840 being 169,000,000, as against 82,000,000 posted in 1839, including 6,500,000 letters sent under the franking privilege, which was abolished with the introduction of the Penny Postage system. In 1851 the number of letters posted had risen to 670,000,000; while last year the quantity sent reached the fabulous number of 1,558,000,000, or about forty-four letters per head of the population. This refers to letters pure and simple. If we take into account post-cards, newspapers, book-packets, &c., the aggregate number of postal packets posted in 1889 will be found to fall not far short of 2,300,000,000. Truly may it be said that the results of Penny Postage have been stupendous. But more than this; the net revenue derived from postage has long, long since exceeded that which accrued under the old system.

The Story of Penny Postage would be incomplete if we did not add a word as to how the great reformer fared at the hands of his country. With the introduction of his scheme he of course became associated with the Post-office, although at first he held a Treasury appointment, from which, however, after about three years' service, he was dismissed on the ground that his work was finished. Public indignation was aroused at this treatment of one who had already done so much for his country; and the nation seemed to think that the right place for Rowland Hill was at the Post-office, where further useful reforms might well be expected to follow from one who had begun so well. At all events, in 1846 he was restored to office, being appointed Secretary to the Postmaster-general; and eight years later he became Chief Secretary of the Post-office, an appointment which he held for ten years, when, from failing health, he retired with full pay into private life, full of years and honours. Soon after his dismissal from the Treasury, a grateful country subscribed and presented him with the sum of fifteen thousand pounds; and on his retirement, parliament voted him the sum of twenty thousand pounds. In 1860 he received at Her Majesty's hands the dignity of Knight Commander of the Bath; and both before and after his retirement, he was the recipient of many minor honours. In 1879 Sir Rowland Hill was presented with the freedom of the City of London; but he was an old man

then, and only lived a few months to enjoy this civic honour. He had a public funeral, and was accorded a niche in the temple of fame at Westminster.

JULIUS VERNON:

A STORY OF HYDE PARK.

CHAPTER VIII.

WHETHER he had been dreaming or awake, when the current of thought passed through his brain, Frank Holmes was unable to think. He had been unconsciously rehearsing the evidence given in the police court. It will be remembered that Lady Southfort stated that Miss Neale hardly ever received a letter, and had certainly not received one for weeks prior to her death—except one, which was from a music-seller. How, then, could Margaret Neale have received a communication making an appointment on that Saturday evening? Not through the post; certainly not by telegram, which would have been still more noticeable; and not personally, for she rarely went out, and never alone. It was at this point that the light burst upon Frank Holmes—if it should prove to be light, and not merely the mirage of a heated imagination. There was one means of correspondence which no one had thought of as yet, and which was worth investigating.

Miss Neale read the morning papers at the breakfast-table. The murder took place on the 10th of June. Holmes alighted from the cab in Fleet Street, and commenced an examination of the morning papers of that date and of the preceding five days. In that portion of the newspapers popularly known as the 'agony column,' dedicated to intrigues, appointments, truth and falsehood, passions and emotions for which there is no other outlet or mode of expression, he hoped to discover some clue to Margaret Neale's strange and unaccountable conduct. No man ever studied the print of a newspaper column with an interest more absorbing. As it would be no easy matter to follow an advertisement back to its original source, it was perplexing to discover, in the first newspaper that he searched, no fewer than three notices during the week in question—one of them being on the Saturday morning—which looked capable of an interpretation applicable to the matter in hand. He had not thought of ascertaining the papers taken in at Lady Southfort's house; the *Morning Post* would be one of them; but in that paper he found nothing like what he was looking for. He carefully copied the three advertisements, and studied them over his breakfast in a restaurant. One was from the Wednesday issue, and was as follows: 'Saturday, old time and place.'

The second was in these terms, and appeared on Friday: 'Have you seen my message? Do not fail.' This might, or might not, refer to the former; if, on investigation, it was found to have been inserted by the same person, there would be good grounds for following it up.

The third, however, was more precise—so precise that, appearing on Saturday morning, it made the young man's heart jump: 'M.—At 9.30 to-night. Park. South of Grosvenor Gate.' Holmes, reading this message, so startling in its

significance, had to steady himself by an effort. It was characteristic of him, and of the thoroughness with which he meant to carry out his task, that he restrained himself from starting off at once on so pregnant a clue. That he was strongly of opinion that he had found what he sought, was certainly the case; but, he argued, would it not wait for another hour or two, until he had examined the other papers? Finding nothing like it in their columns, he could address himself to following up the origin of this advertisement with the greater vigour and fixity of purpose.

Yet, as he was passing the offices of the newspaper from which he had taken the notices, on his way to another publishing office, he was unable to resist the temptation to go in and find out where the advertisement had come from. It was the easier for him to do this from the fact that he was personally well known in the office. He knew whom to ask for at that early hour, and was immediately shown to the gentleman he wanted.

'Gissing,' he said at once, 'I want to know who inserted that in the issue of the 10th?' He laid the copy before the assistant-manager as he spoke.

The latter read it and slightly raised his brows. 'I'm afraid I can't oblige you, Mr Holmes. You know that these things are confidential.'

'I am not seeking to indulge curiosity, Gissing. The business I am now upon is more serious. That advertisement appeared the morning of the day Margaret Neale was murdered in Hyde Park. Now, you will understand my motive.'

Mr Gissing started, took up the advertisement and re-read it with deep interest, and then went to a file and confirmed it by referring to the newspaper itself. 'By Jove, Mr Holmes,' he said, 'that does look—odd.'

'If it should turn out that the advertisement has obviously another connection,' said Holmes, 'I will respect the confidence placed in me, should you make known its origin. If, on the other hand, it sheds a light upon that tragedy, surely you will not withhold it?'

'Surely not.—Just wait a minute or two, and I'll tell you where it came from.'

Mr Gissing spent a while turning over the leaves of a large book until he found the advertisement. Opposite the cutting was the cost, and the name of the party ordering the insertion and paying for it. The name was 'J. Grierson, Mount Street, Park Lane.'

'Grierson?' said Frank Holmes, trying to remember the name.

'Grierson. He is a stationer, who takes in advertisements for the morning papers. He could tell you who gave him this one to insert.'

Holmes thanked Mr Gissing, and went away. The discovery looked very ominous; and he thought anxiously of Mary Clayton in view of the final disclosure which seemed looming. What if it should prove the riveting link in the fatal chain of evidence coiled around the prisoner Faune? Holmes had promised her to work for Faune's acquittal; and this was what he was doing! Impelled by a force which he was now unable to resist, he was powerless to turn against it and say: 'I will go no farther!' He would have to go farther—as far as the light would bring him; and he resolved that what he dis-

covered he would place in her own hands, to do as she willed with it.

He strongly felt that there was no need for further investigation until the source of this advertisement had been ascertained. On this, all would depend. He therefore drove off to Mount Street direct, and went into the stationer's shop, asking for the proprietor.

Grierson was not in, which, perhaps, made Holmes's task an easier one, since it was Mrs Grierson whom he saw. She was a nervous little person, evidently not accustomed to her husband's shop. So he ventured at once to ask her to let him know who ordered the insertion of that advertisement in the morning paper of the 10th of June.

She took the copy from his hand in a half-bewildered way, and proceeded mechanically to search the books for the original. Suddenly she shut up the book with a frightened look and gave him back the slip of paper. 'Oh, I was forgetting,' she said quickly; 'I mustn't tell you—we are not allowed to tell anybody. My husband will soon be in, sir, and you can speak to him about it.'

It was hardly fair to use the opportunity; but the husband, for all that Holmes knew, might be an obstinate man—no uncommon phenomenon when you want very particularly any information from the species—and it was of vital importance to discover the author of the advertisement.

'Did you ever see the Miss Neale who was murdered near the top of this street?' he asked.

The woman started, and stared at him. 'Yes, many times,' she answered. 'She used to come here with the young ladies to buy things.'

'Now, Mrs Grierson, I have reason to think that it was in answer to this advertisement that poor Miss Neale was led to go into the Park that night. You notice the date—it was the 10th of June. If you conceal the author of that advertisement, you may be concealing the author of her death!'

The woman clasped her hands and trembled from head to foot. Then a hot flush leaped to her face, and with indignant eyes she rushed to the book which she had shut up a minute before. 'I—conceal him!' she cried. 'Heaven forbid—oh, the villain!—and seeing her sweet face so often in this very shop—conceal him'—Power of further speech failed her, and she dashed over the leaves of the book with an hysterical energy which seemed likely to rend them in pieces. 'Here it is!' she exclaimed, throwing the book down upon the counter.—'June the 9th. "M.—At 9.30 to-night. Park. South of Grosvenor Gate."—Look at it, sir, and at the name and address!'

The woman's excitement was hardly greater than his own. The first glance at the handwriting of the original copy sent the blood to his heart; and appended was the familiar signature, 'C. Faune, 313A Mount Street.'

For a time Holmes was unable to speak—almost unable to think. He remained standing before the little counter with his hand upon the open book. The discovery, even though he had anticipated it, stunned him. It was the last rivet.

What was to be done now? His situation was painfully perplexing. This tremendously ominous piece of evidence was not his alone, to do as he willed with it—it was that woman's, and would presently be her husband's, and within an hour would be in the possession of the police. What promise was it that he had made to Mary Clayton? 'If he were acquitted, I should care nothing! What would this trial matter to me then? Oh, if he should only be acquitted, Frank, I would kiss the feet of the judge and jury who told him he was innocent!' And he had solemnly promised her, then, to do all that lay in his power to secure Faune's acquittal; and her arms flew to his neck as she kissed him for it. What fatality had brought him to this—and what would Mary Clayton think of him? The poor fellow groaned, and for a desperate half-minute was violently tempted to seize the fatal book and make away with it. Nay, he might have done this—thinking of her—but for the suddenly discovered presence of another man behind him, who had entered the shop unobserved by Holmes, and was now regarding, over the young man's shoulder, the writing in the book with quiet but intent interest. It was Mrs Grierson staring at the newcomer who drew the attention of Holmes to him; and slightly starting, he dropped his hands by his side, with a movement of despair, on recognising a noted officer of Scotland Yard.

The officer's interest in the copy of the advertisement changed into a look of unqualified admiration as he spoke to Frank Holmes. 'Mr Holmes, you are a man of genius,' he said quietly. 'No one else would have thought of it. I was up the street, putting ideas together, when I saw you come in here; I only dropped in to have a chat with you, little dreaming of—this!'

Holmes felt sick. The officer lost not another moment in taking possession of the book, which he carried away with him.

'This looks very like the missing link, Mr Holmes,' he observed, with deep satisfaction; 'but of course I shall not lay any claim to the credit of it. I should never have made the discovery—nobody except yourself could have done it.'

'For Heaven's sake, Cracroft,' said Frank Holmes with an air of abhorrence, 'take all the credit of it, and don't bring my name into the business at all!'

'I can't help doing that, Mr Holmes,' replied the conscientious officer; 'but it will only be among ourselves—it is no concern of the public how or by whom the evidence was obtained. I am going to Lady Southfort's house now, and I will let you know later on if any further evidence turns up.'

Holmes went on down the street, while the officer turned into Grosvenor Square. The reader knows the intention with which the young man had actively entered into this case, and can measure the feeling with which he reflected on his discovery. Suppose that the officer Cracroft had not come on the scene when he did—Holmes would have gone, reluctantly, it is true, and communicated to Miss Clayton the evidence he had found. He would have made no use of it without her wishes being known. Now, it was out of his power to keep the discovery back, and

he was grievously uneasy on account of it. She was excited, her nerves were much strung up; would she think unkindly of him for what he had done?

Holmes could not help sharing the officer's view that this was the 'missing link'—the evidence, which was felt to be so necessary, of Faune's correspondence with Margaret Neale. It looked perilously like it. The initial M, the time and place, the authorship of the message, all pointed to one dread conclusion. He knew how the police would rivet it.

He remembered his promise to Mr Clayton, and drove into the City. What Mr Clayton had to say to him aroused a very lively interest, and gave him the stimulant which at the time he so much needed.

'It was only yesterday, Frank,' said the banker at once, 'that it struck me. I might have thought of asking you before. You recollect what I spoke about that Saturday night when you came to Cadogan Place?'

'You refer to the—money?'

'The money. I confess, Frank, I sympathised with Faune when he mentioned his embarrassing position to me. He felt that—that he was causing you some pain, perhaps—in regard to Mary, and his indebtedness to you was a grievous burden to him under the circumstances. Then I took the course which you know: he gave me a rough estimate of all the money he had had from you—between four and five thousand pounds—and I handed him a cheque for that amount—for five thousand, I mean, to cover interest and all. I fancied he would pay it in, and send you his own cheque for the money; but I see now he was too eager to pay his debt, and just gave you my cheque after endorsing it.'

Holmes stared at the banker in amazement, as well he might.

But without observing this, Mr Clayton proceeded: 'It was only yesterday I saw the cheque, which I had drawn on my private account; and then,' he added, with eager interest, 'the question struck me at once—When did Faune give you the cheque? Was it when he met you that night at Albert Gate?'

'No,' the other answered, like a man in a dream.

'Then, when did he pass it to you? Did he send it by post, or how?—Don't you see, Frank, how every act of Faune's that night is important—the most trifling act might now be turned to vital account for him, if he is innocent?'

'Mr Clayton, I have never seen the cheque you are speaking of.'

It was now the banker's turn to be amazed; there was no doubting the solemn earnestness of the declaration made by Holmes. 'Why, bless my soul,' exclaimed Mr Clayton, opening a drawer, 'here is the cheque, endorsed by Faune and yourself, and cleared through the Anglo-Canadian Bank, Charing Cross!'

'If the cheque had come to me, it would of course have been paid into my account here.'

'I thought it odd.—But look at it.'

Holmes looked at it for a second, and handed it back in silence. Mr Clayton drew a deep breath, for he knew what it meant—the name of Frank Holmes on the back was forged, and

the purpose of the forgery was manifest: it was done with a view of getting the money, and at the same time deceiving Mr Clayton, who of course would see the draft after its clearance, and think naturally enough that Holmes had got the money. But why it was so done was a mystery.

'I wish you could find it out, Frank,' said Mr Clayton; 'I much wish it. Do you think you could?'

'I could get it done, perhaps. But it strikes me, Mr Clayton, it had best be left alone. The fact is sufficiently apparent; and if we go diving after the motive, we may only bring up something that we would rather have left where it is.' Then he related what had happened in regard to his own researches that morning—a relation which profoundly agitated Mr Clayton.

'Mary will not misjudge you, Frank,' he said with a deep sigh. 'It has been unfortunate—for all of us!'

To this, Frank Holmes could say nothing. It was indeed a day of ill omen to all of them when Claude Faune first entered the house in Cadogan Place—and who had brought him there?

'Take this draft with you, in case it should be of any use,' added Mr Clayton; and placing the paper in his pocket-book, Holmes went away.

(To be continued.)

THE MONTH:

SCIENCE AND ARTS.

It was long ago anticipated that the Eiffel Tower at Paris would prove to be useful for scientific observations; but the most sanguine did not suppose that its value would be as great as it actually turns out to be. Meteorologists who have had opportunities of making observations from its summit are loud in its praise, and consider it to be absolutely unique as an observatory. Of course there are many observatories at a higher elevation above the sea-level, but the records obtained at such stations are naturally influenced by the high land all around them. The Eiffel Tower, on the other hand, springs directly from a flat country, and the observations taken at its summit can be at once compared with the condition of things at its base. These often show a curious and wide divergence. For instance, in summer the temperature on the tower is lower and in the winter higher than it is on the ground. A few months ago a severe frost was enveloping the city while a warm breeze was blowing up above, the benefit of which was not felt by the people at the street level until three days afterwards.

Some months ago we gave an account of the Boston Steam-heating Company, which was formed to supply steam and hot water to the citizens of that American city. Four miles of mains were put underground at a cost of four hundred thousand pounds; but although these pipes have only been laid two years, they have rusted away to such an extent that the company has been forced to suspend its operations.

It is said that the number of pearl oysters

collected last year at the Ceylon fisheries will barely cover the cost of bringing them from the sea-bottom, although the government usually make a handsome profit on the year's work. One reason for the falling-off in the returns is the outbreak of cholera, which attacked the workers in the spring; and another is found in the circumstance that later in the year a shark carried off one of the divers. His fellow-workmen, fearing the same ghastly fate, refused to enter the water.

Among the novelties shown at the late Paris Exhibition was Amiot's Stair-climber, an apparatus which is very likely to come into use in houses where there is no provision for a lift of the ordinary kind. It consists of a small platform, upon which one person can stand at a time, and which runs up the stairs, be they curved or straight. The motion is brought about by electricity, water-power, air-pressure, or steam, according to convenience. A couple of steel bands or rails are attached to the balusters, and follow their contour, and upon them runs the carriage to which the platform already referred to is fastened. The little platform will rise, descend, or stop at the will of the passenger who occupies it. This apparatus will be much appreciated by aged persons who are occupiers of old houses, to whom the work of walking up-stairs is a great strain on the strength; but younger persons will be inclined to look upon the machine rather as an obstacle to progress than a convenience.

Mr Gallwey of Thirsk has published an account of some novel experiments in weather prediction, the result of which causes him to ask the pregnant question, 'Do our experts advance one iota in the accomplishment of foretelling weather?' This ingenious experimenter made it a practice to take every published weather forecast throughout the past year from the daily newspapers and to paste it in a book, afterwards taking care to note whether the forecast was justified by the weather that followed. After giving the 'clerk of the weather' the advantage of every doubtful case, he found that that hypothetical gentleman was correct only in two cases out of every three. But in order that the inquirer might test his theory that there was a great deal of haphazard guesswork about these forecasts, he took a course which can hardly be called scientific: he pasted the published forecasts for one month each on a separate card, put them into a bag, and after giving the contents a good shake up, took out one each day of the following month, and compared its reading with the weather which then happened to prevail. He found that with regard to correctness of results it was a neck-and-neck race between himself and the clerk of the weather, the latter having the advantage of him at the end of the month by only four 'corrects.' From this it would seem that our meteorological experts would do well to consider the recommendation of the American humorist who said, 'Never prophesy unless you know.'

An American doctor has lately pointed out the value of petroleum in lung, throat, and bronchial disease. His attention was called to it by the circumstance that drillers, pumpers, and other workers at the oil-wells, among whom he practised for some years, although they were exposed

to all weathers, never suffered from such complaints. He attributed their immunity from disease to the saturation of their systems with the vapour from the oil. Since that time he made many attempts to use the crude oil in his practice; but it is not by any means one that could be called 'an elegant preparation,' for it is disgusting both in taste and smell. Of course it can be made up in the form of pills; but these will not touch many throat diseases for which the remedy is valuable. It is not known how the curative properties of the oil are exerted. It may be that it acts as a germicide, for it is a certain thing that insect life at least is impossible where its influence prevails.

The Humorous and Grotesque Art Exhibition which was lately opened at the Victoria Gallery, London, is of the most interesting character. It consists of a series of more than two thousand pictures which mostly have been drawn by artists who lived and flourished a century back. The Exhibition is especially rich in examples of Gill-ray, Rowlandson, and Bunbury, whose powers of exaggerated caricature would in many instances be deemed vulgar in our more refined times. Many of the pictures are of a political character, and parody events which have long ago been forgotten, hence their meaning to the present generation is somewhat obscure. Cruikshank is well represented, his exaggerated representations of the fashions in vogue at the beginning of this century being very ludicrous. We are glad to notice that the promoters of this unique Exhibition have followed the commendable course of illustrating their Catalogue with nearly sixty-five examples taken from the principal works. This custom is now becoming common, and is one of the improvements which we owe to photography.

There was a time when an English-made watch was considered the very best which it was possible to obtain, and one great seat of the industry was Prescott, near Liverpool. But with the advent of machine-made watches from the Continent, and of late years from America, the trade of Prescott began to decay. The Lancashire Watch Company has been formed to revive this lost trade, and have erected at Prescott a huge factory fitted with the most modern machinery. This factory was lately opened with some little ceremony by Lord Derby.

During the past few months there have been three or four serious accidents in London from the break-down of omnibuses, in each case the axle or the wheels suddenly giving way. The cause of these disasters, which up till now have been almost unknown, may possibly be traced to the very large number of passengers carried by each omnibus since the fares have been so much reduced, the extra weight telling upon the older vehicles. The crossing of tram-lines also involves a strain upon the wheels which often threatens to tear them off. In order to obviate all risk of danger from such accidents, Mr D. Cremmen, omnibus-builder, of London, has lately invented a Safety Appliance, which has been tried with great success. This invention consists of four projections from the axles of the vehicle, one being placed just behind each wheel. Each of these projections has a small wheel at its base, the normal position of which is about one inch above

the roadway. But if from any cause one of the main wheels of the vehicle gives way, the small one corresponding with it is brought into play, and the vehicle is prevented from falling down.

A correspondent of the *Times*, referring to the Jubilee of the Penny Post, which has lately been observed with some ceremonial in London, calls attention to the circumstance that a Penny Postal system was in operation in the metropolis two hundred years ago. It is described by Pennant, and would seem to have been a venture of a private character, and quite apart from the General Post-office supervision. Pennant tells how under this system one could send a letter from one side of the city to another, or to any of the suburbs—Kensington, Chelsea, Islington, &c., then detached villages—for one penny, and asserts that there were several deliveries daily. Indeed, if we may believe what he says, it would seem that the service partook as much of a parcel post as one for the conveyance of letters, for his concluding words are as follows: 'Nor are you tied up to a single piece of paper, as in the General Post-office, but any packet under a pound weight goes at the same price.'

An American official has recently sent a Report to his government respecting the value of an Australian vegetable product which he asserts will prove of great value as a substitute for oak-bark in tanning. This is the Wattle, which is extensively cultivated in New South Wales and Victoria. There are two varieties of this tree, which belong to the *Acacia* family, namely, the Broad-leaved Wattle and the Black Wattle. The latter yields the greater amount of tannic acid, that is, thirty to thirty-two per cent., which is nearly double that which is afforded by the bark of the Santa Cruz Oak. To this circumstance may be attributed the fact that hides can be tanned in liquor made from Black Wattle in forty-seven days, while in the liquor made from Santa Cruz Oak the time is at least seventy-five days. The compiler of this Report recommends the Government authorities to purchase in Melbourne a quantity of seeds from both varieties of Wattle, which can then be distributed among agriculturists in the different States. It would seem that the tree flourishes best in a dry climate and a poor soil.

The *Medical Press* has lately called attention to the serious risks to which patients are exposed by the custom among many medical men of writing their prescriptions illegibly. We are told that prescriptions are commonly handed to chemists so badly written that it is almost impossible to decipher them, and that it is often difficult to guess what drugs are intended to be represented by the strange hieroglyphics depicted. Doctors are not the only sinners in this respect, as any one with a large correspondence knows to his cost. It is by no means an uncommon thing to receive a letter the translation of which is as painful an experience as listening to the efforts of a stut-terer to make himself understood. Persons who cannot acquire the easy art of writing legibly should in mercy to their correspondents employ a secretary to do the work for them. So much importance is attached to the legible writing of a prescription, that it would be well if they were always passed through a type-writer before reaching the hands of the compounder.

Some time ago it was stated in these columns that Professor Elihu Thompson of Lynn, U.S.A., had introduced a method of welding metals by electricity. The principle of the operation is based on the circumstance that when the terminals of a battery or suitable dynamo-machine consist of metallic conductors, these when brought together will manifest enough heat to bring each to the melting-point. The same terminals furnished with carbon points constitute the well-known arc-light, in which a far more refractory substance is fused. The Electric Welding Syndicate has been formed to introduce this system on a commercial scale in this country. In London lately, a demonstration was given to show how efficiently and how quickly the electric current can be made to weld together metallic bars, pipes, &c. In practice, the pieces of metal to be joined together are held in clamps with their ends in the exact position which they are to occupy when joined. The current is now applied, and the two ends are pressed together by the action of a lever. In a period varying from a few seconds to a minute or more according to the size of the pieces joined, the operation is complete. The joint thus made will stand the most rigorous mechanical tests, showing that it is in every respect as perfect as one produced in the old laborious way.

An American Fire Insurance Company has lately issued a circular which calls attention to the danger of spontaneous combustion in cotton bales owing to the presence of cotton-seed oil. An instance is here given in which two bales had absorbed as much as two hundred pounds of oil apiece, probably from barrels contained in the same cargo. Cotton thus impregnated with oil has long been known to be liable to spontaneous combustion, and there is very little doubt that many vessels have been lost at sea through this initial cause. It is recommended that cotton bales should be examined and watched for this source of danger both on shipboard and in warehouses.

Some beer contained in bottles was lately found walled up in the cellars of a brewery at Burton-on-Trent. This beer was brewed nearly one hundred years ago, as the records of the firm showed, and as was proved by the old style of the bottles. The beer was brilliant, and quite drinkable, but it had lost its bitterness, and had assumed the character of sherry. Dr Morris read a paper on this curious discovery before the Laboratory Club, London, and said that in examining the sediment of this antiquated beverage microscopically, he was led to suspect the presence of a few yeast-cells which still retained their vitality.

The refrigerating chambers on board ship have for a long time enabled our markets to be supplied with excellent meat which has been killed at the antipodes, the process of freezing it preserving it fresh during the longest voyage. It is when it arrives in port that the meat suffers deterioration through partial thawing during the process of moving it from the ship to the market. This difficulty has recently been obviated by the establishment of a fleet of refrigerating barges, that is to say barges which contain cold chambers similar to those on board the ships. But whereas the cold on shipboard is produced by expansion

of air, the system adopted for the barges depends upon ammonia. The ammonia is kept in a separate barge, but by the attachment of flexible piping the freezing chambers belonging to any other barge can be brought to a temperature approaching zero in about ninety minutes. This system has been introduced by the London and Tilbury Lighterage Company.

At the recent annual meeting of the Meteorological Society, a most interesting paper on 'Atmospheric Dust' was read by the retiring President, Dr Marceet. He remarked that the dust which, when lighted up by intense light, we call motes in the sunbeam is chiefly of an organic character, and it is impossible to say how much of it is innocuous, and what portion of it may become the source of disease. There is little doubt that many of these motes must belong to the class of micro-organisms, and thus form the means of spreading infectious diseases. He also remarked upon the injurious nature of many trades where dust is constantly breathed into the lungs, and gave some account of the danger of certain kinds of dust forming with air an explosive mixture. Volcanic dust, consisting of mineral matter in a fine state of subdivision, also came under review, and the interesting paper was brought to a fitting close with an account of the dust phenomena which followed the terrible eruption of Krakatau in August 1883.

A JUST IMPEDIMENT.

'I REALLY think that I, Eva Hamilton, am the unhappiest girl in existence. I am engaged to marry a great stupid awkward creature, whom I have known for less than a month, and detest as if I had known him all my life; while Fred—you know you met Fred last summer—is staying in the same house, and can hardly speak a word to me, such is the devotion of my odious fiancé.'

The foregoing extract from a letter to a girl-friend represents the condition in which I found myself not very long after my nineteenth birthday. As I now look back on what happened long ago, I wonder how it was that Gilbert Darien, 'my odious fiancé,' managed to put up with my ill-temper and evident dislike for his company, not to mention my incessant flirtation—for I'm afraid I did flirt—with Fred.

Poor Gilbert! He certainly was awkward—one of those big men who cannot move without upsetting something, whether it be a valuable china vase or your equanimity; with a heavy colourless face, and nothing characteristic about him save the difficulty he always experienced in disposing of his hands, which is not, however, uncommon amongst men. To these shortcomings must be added his method of breathing: it was stertorous, and could be heard at a distance of twenty yards. But I oughtn't to abuse it, seeing that it often gave us warning in our stolen interviews of his approach, and became ultimately the means of my release from him.

I was not much over nineteen when one day my father addressed me at breakfast: 'Eva, Mrs Darien wants us to go there on the 5th.' This apparently innocent remark nearly annihilated me. The long-expected blow had fallen at last.

Shortly after his return from India, my father, who was little better than a stranger to me, had thrown out certain ominous hints as to the expediency of my getting married; and then one fine day informed me outright that it was his one wish to see me happily wedded to the son of his old friend Darien. I was not unnaturally aghast. Not to mention a 'prior attachment,' I had never seen Gilbert. How could I marry an utter stranger? How could I throw over Fred because he had only four hundred pounds a year, while his unknown rival had four thousand? I had no mother to confide in, and had not the courage to confess all to my respected parent, who had returned from India a broken-down invalid, whose one object in life was, as he informed me some twenty times a day, to see me happily married to the son of his old friend. 'Happily married, forsooth, to a man one detests,' I bitterly exclaimed, perhaps rather unfairly, as I had never seen Gilbert, who, for aught I knew, might have been an Adonis as well as a future Cræsus, though, from my father's significant silence as to his personal appearance, I had my doubts.

At all events, one thing was certain, and that was that I was not going to give up Fred; and with this resolution I sat down and wrote a long letter to him, in which I set forth my woes. When I received Fred's answer, I was agreeably surprised to find that the Dariens were not strangers to him, as he had stayed with them as a friend of a younger brother of Gilbert's. 'There is something,' he wrote, 'fishy about Gilbert. The fellow never leaves home, and is about as ill-bred a hippopotamus as I have ever met. The idea of your marrying him!' And here followed a long diatribe on my father and on what he called the 'cussedness' of things in general, and his financial affairs in particular. However, there was a crumb of comfort at the end of his letter, and that was contained in the information that he would fish for an invitation to Darien Hall while we were there.

My curiosity was excited by the mystery, the 'something fishy' about the man whom my father had chosen to be my future husband. Was he subject to fits of madness? Was he a klepto- or dipso- or anything else horrid ending in o-maniac? I determined to cross-question my father, and that evening I set about the task.

I ultimately succeeded in eliciting the following information. 'That Gilbert was the image of his poor father' ('The fright!' I mentally ejaculated, for I had seen a photo of the poor father, in big baggy white trousers, the legs crossed, and regarding with a wondering smile—as well he might—an enormous misshapen silk hat); 'that he very rarely left his home, having been educated there by private tutors' ('keepers,' I exclaimed to myself); 'that Darien Hall had the reputation of being haunted; that it was my father's one wish in life to see me happily married to the son of his dear old friend; and that he (my father) wished I would not pester him with my idiotic questions.' This last because I asked if Gilbert's eyes were blue (Fred has the most charming blue eyes you ever saw).

My father and I arrived at Darien Hall late one evening; and a single glance showed me that my worst fears were realised. The photograph of

my father's 'dearest friend' might have been a portrait of the Apollo Belvedere compared to the dearest friend's son, to whom, however, it bore a striking resemblance with regard to the inane smile, a smile which, in addition to his general sheepish manner, told me plainly that Gilbert was aware of our respective parents' plans that we two should come together.

The next morning there was a kind of solemn betrothal scene, at which Mrs Darien and my father officiated, and during which Gilbert, like the person in the nursery rhyme, continued to smile—perhaps at my misery.

The following three days I spent in coyly repelling the advances of my prospective husband. I was only sustained by the thought that soon Fred would arrive, and the hope that he would find some method of relieving me from my painful position.

Gilbert had the impertinence to remark that he hoped I should like young Fred Haliwell, though, between ourselves, he was 'rather a prig.' Finally, Fred arrived, and was solemnly introduced to me as an utter stranger. One of the few occasions on which I saw Gilbert's smile dry up was when he noticed how rapidly I got on with a man whom, as he thought, I had just met for the first time.

The days went by and my position grew more and more hateful. More than once I determined to make a clean breast of it to my father; but I could never screw up my courage to pay such an insult to the memory of his dearest friend as to decline to marry his son. Moreover, though I had attained the age of nineteen, I had, strange to say, the remnants of a conscience, which from time to time gave me horrible mental twerks for what it was pleased to call my double-facedness, I being practically engaged to two men at the same time. But what excuse could I give my father for breaking off my engagement to Gilbert? It would not have been the slightest use to plead that I didn't love him, or to find fault with his mental or bodily features; while to confess that I was in love with Fred would have resulted in obtaining that penniless youth his congé from Darien Hall.

Fred in the happy-go-lucky way which is one of his chief failings ('No, I'm not,' is here interposed in the manuscript which I gave my husband to correct)—Fred, I repeat, with a Micawber-like trust in the future, insisted that something would turn up sooner or later, and that we had better wait till that sooner or later, and spend our time meanwhile in making the best of it, which we did so effectually, that even the long-suffering Gilbert suddenly took it into his head to remonstrate with me on my manner to 'that fellow Haliwell.'

One morning during breakfast Fred bestowed upon me a series of mysterious nods and winks, which evidently meant that he had something important to tell me. He aroused my curiosity by whispering in my ear as he passed me a cup of coffee: 'I have found out why he never leaves home.'

After breakfast, I despatched Gilbert to look for a pair of gloves, which I happened to have in my pocket, and followed Fred into the garden. Leading me out of sight of the house, he

delivered himself of the following oracular and unintelligible remark: 'He has epileptic fits.'

'Good gracious! How did you find out?'

'Well,' said Fred, who was radiant with joy at his discovery, 'I'll tell you. You know I went up early to roost last night, and when I got into my room my candle blew out. I couldn't find the matches anywhere; so I went off to Gilbert's room, glad of an opportunity to see the inside of it, for he keeps a fellow out of it as carefully as if it were a Bluebeard's cupboard, with dead wives all hanging about. There was no one there; so I walked straight in, saw a luminous box of matches, struck a light, and looked round. The walls were all padded!' Fred paused in triumph.

'Is that all?' I cried.

'All indeed! Why, don't you see? It's as clear as daylight. He's subject to fits, and throws himself all over the place, and the walls are padded so that he shan't hurt himself.'

Fred's argument seemed plausible enough; and if his conjecture was correct, here was a splendid manner of convincing my father of the impossibility of my marriage with Gilbert.

'Why, it's a clear case of just cause and impediment,' cried Fred. 'Even four thousand pounds per annum can't make up for those fits. Why, he might bite you in one of them, and give you hydrophobia, and then there'd be the fat in the fire with a vengeance.'

But if he was subject to fits, why had he never had them during the time we had been in the house? He had never failed, as we knew to our cost, to put in an appearance in what happened to be going on each day, and usually behaved, as Fred reluctantly allowed, 'like a Christian.' Finally, in our ignorance of matters medical in general and fits in particular, we decided that he only had them by night, and that this was the reason why he never slept away from home.

After much consideration, we determined with reluctance that the only way to discover the true state of affairs was for Fred to conceal himself in Gilbert's room and find out if our conjecture was correct.

I scarcely slept a wink on the night on which Fred had settled to put his project into execution, expecting every minute to hear piercing shrieks from the remote quarter of the house in which they slept. However, nothing occurred to disturb me; and meeting Fred before breakfast, as we had arranged, in the garden, I overwhelmed him with a flood of questions. 'Did he frighten you much? How did you manage to hide? Is he very violent? Does he foam at the mouth?'

After a tantalising and, to me, inexplicable fit of laughter, Fred told me what had happened. 'I managed to hide myself in a wardrobe in his room, and, after what seemed a fearful time, Gilbert came up and began to undress. Good heavens! You should see the way that fellow ogles himself in the glass; why, he's nearly as bad as you—as a girl, I mean. Well, I was in an awful funk that he'd open the wardrobe, but he didn't; and at last he got into bed without having shown the slightest symptoms of having a fit. I can tell you I was disappointed, and determined to wait till he was

asleep, and then leave the room. I must have dozed off, for suddenly I woke with a fearful start, at what I thought was a clap of thunder, about an inch from my ear. In three seconds I had found out the secret of the padded walls: he snores like a steam-worked fog-horn !'

Fred was right. This was the horrible seamy side to the silver lining of four thousand pounds a year.

We had a certain delicacy about informing my father of the one failing of his dearest friend's son, so we had recourse to stratagem. We managed to contrive that Gilbert and my father should be boxed up together for a ten-mile drive home from a ball in the neighbouring county.

We left Darien Hall the next day.

'I assure you, my dear, that young fellow cracked the carriage window, not to mention the drum of my ear, with his snoring. I could not think of your marrying such a man. His poor father never did such a thing.'

THE POETS AND ARTISTS OF GALLOWAY.

THE ancient province of Galloway, occupying the south-western extremity of Scotland, is now represented geographically by the counties of Wigtown and Kirkcudbright. The district is in some respects peculiar. Like the Highlands, it was later than the rest of Scotland in emerging into civilisation. This was due to the fact that within this province there existed till within the last few hundred years traces of those very ancient and sufficiently mysterious people known from the time of the Romans as the Picts. They defied conquest, as they also declined to adopt the dress or language of their neighbours. Even as late as the time of Robert Bruce they formed a kind of nationality by themselves, and the ancient kings of Scotland used to address them in charters, by way of distinction, as the 'Men of Galloway.' It is not without interest, therefore, to the literary reader to come upon a handsome volume, emanating from this ancient province—printed at Castle-Douglas, published at Dalbeattie (famous mostly for its granite quarries)—and the whole contents of which have issued from the brains of Galloway men and women.

The book we allude to is *The Bards of Galloway* (Dalbeattie: Thomas Fraser), being a collection of poems, songs, and ballads, by natives of Galloway, and illustrated wholly by Galloway artists. It has been efficiently edited by Mr Malcolm M'L. Harper, author of *Rambles in Galloway*, who also supplies an introduction and notes, with brief biographical notices of each of the sixty-four poets, living and dead, whose rhymes are here embodied. Of the ten artists whose pencils have been lent to embellish the volume, two are the well-known and eminent brothers Thomas and John Faed, the exquisite landscapes of the one and the charming interiors of the other being familiar to all lovers of art. It would be saying too much to describe the verse here printed as being all stamped with the hall-mark of genius; William Nicholson's 'Brownie of Blednoch' being without doubt the best known and most remarkable poem in the

volume. 'Mary's Dream,' by John Lowe, also has fine touches, with its beautiful opening lines:

The moon had climbed the highest hill
That rises o'er the source of Dee,
And from the eastern summit shed
Her silver light on tower and tree.

But most remarkable of all is to find here a few songs by one Patrick Hannay, a Galloway gentleman of the time of Charles I., which songs have the genuine ring of the period in which they were produced. The quaint conceits and graceful whimsicalities of sentiment and style remind one instinctively of Herbert and Quarles and Carew, of Sir John Suckling and Richard Lovelace. It is as if Charles and his courtiers of Whitehall had moved for summer quarters to the wilds of Kirkcudbright. The general poetical productions are as various as the skill of their makers is unequal; yet the volume is creditable alike to editor and publisher, and forms a striking tribute to the artistic and poetic genius of this south-western nook of Scotland.

THE SNOWDROP.

THROUGH days of rain and nights of snow
A Flower grew silently and slow,
Till all around was white;
Then clad in robes of tender green,
With fairy bells that peep between,
The Snowdrop seeks the light.

What kindly hand has tended thee
In thy dark cell where none could see
The future promise bright?
How could we know while Nature slept,
A treasure like thyself she kept
To gladden Winter's sight?

Only a drooping Flower of Snow!
It sets the beating heart aglow
With hopes of brighter times;
And while the little snowbells ring,
We hear the music of the Spring
Float on the airy chimes.

A Flower so tender, yet so brave,
That springs from out a wintry grave,
Needs not the praise of song.
I hear thee whisper, Flower of Snow:
'Through days of sorrow, nights of woe,
Be hopeful, and be strong!'

R. A. MACWILLIAM.

* * TO CONTRIBUTORS.

- 1st. All communications should be addressed to the 'Editor, 339 High Street, Edinburgh.'
 - 2d. For its return in case of ineligibility, postage-stamps should accompany every manuscript.
 - 3d. To secure their safe return if ineligible, ALL MANUSCRIPTS, whether accompanied by a letter of advice or otherwise, should have the writer's Name and Address written upon them IN FULL.
 - 4th. Offerings of Verse should invariably be accompanied by a stamped and directed envelope.
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